



Early detection of the risk of developing psychiatric disorders: a study of 461 Chinese university students under chronic stress

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Abstract: Chronic stress, a characteristic of modern time, has a significant impact on general health. In the context of psychiatric disorders, insufficient coping behavior under chronic stress has been linked to higher rates of (1) depressive symptoms among subjects of the general population, (2) relapse among patients under treatment for clinical depression, and (3) negative symptoms among subjects with an elevated vulnerability to psychosis. In this normative study we assessed basic coping behavior among 461 Chinese freshman university students along with their consumption behavior and general health in terms of regular exercises, physical health, psychosomatic disturbances, and mental health. The assessments relied on two instruments that have already demonstrated their capability of (1) reliably detecting insufficient coping behavior under chronic stress and (2) reliably quantifying the interrelation between coping behavior and mental health in the Western world. Thus, we aimed to complement existing data and to develop a generally available, socioculturally independent tool that can be used for the early detection of subjects with an elevated risk of mental health problems. Structural analyses yielded essentially the same scales "activity" and "defeatism" as previous studies on 2,500 students from Switzerland, Italy, Spain, the USA, and Argentina. These scales explained 74.3% of the observed variance in coping behavior among the 461 Chinese students. We found highly significant correlations ($p < 0.0001$) between the "defeatism" scale on the one hand, and the scales "regular use of medicine," "psychosomatic disturbances," and "impaired mental health" on the other. Particularly intriguing was the finding that a neural net classifier could be constructed to identify students with the highest contributions to the interrelation between "coping behavior" and "mental health," yielding a correlation coefficient as high as $r = 0.597$ for the respective subgroup. Based on the normative data, an online tool for risk assessments was developed with immediate feedback to users. This study provided another piece of evidence regarding the close link between basic coping behavior and mental health, across cultures and ethnicities. In consequence, our approach to quantifying basic coping behavior, along with other risk factors, can be expected to clear the way for an "early" detection of students with an elevated risk of stress-related mental health problems, nota bene prior to the development of clinically relevant symptoms. The socioeconomic impact of the potential prevention of depressive -disorders, and psychiatric disorders in general, may be enormous.

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Early Detection of the Risk of Developing Psychiatric Disorders: A Study of 461 Chinese University Students under Chronic Stress

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Significance of the Study

- All evidence derived so far from Western world data suggests that the two COPE scales “activity-passivity” and “defeatism-resilience” are largely independent of sociocultural contexts, thus representing evolutionarily old personality traits, significantly linked to impaired mental health and psychosomatic disturbances. Answers to the questions addressed by this study are highly relevant concerning the scales’ universal validity. In fact, confirmation of universal validity is of major practical relevance, given the fact that the traits can be quantified reliably and used for risk assessments regarding the development of psychiatric disorders (not necessarily stress-related).
- Should the study data support the COPE scales’ universal validity, we also aimed to develop an easy-to-use, web-based “test” on basic coping behavior that gives immediate feedback to users upon completion of the online test. In fact, from the prevention perspective such an approach appears to be most intriguing given (1) the 12–18% of the general population which is unable to adapt adequately to chronic stress and (2) reports indicating that this kind of feedback, and “biofeedback” in general, can induce behavioral changes in a considerable number of users who will move toward being stronger, healthier, and happier (“strengthening resilience”). Consequently, another goal of this project was to make such a web-based “test with immediate feedback” generally available in major languages.

Keywords

Chronic stress · Basic coping behavior · Mental health · Prediction · Early detection · Prevention · Normative data · Neural nets · College/university students

Abstract

Chronic stress, a characteristic of modern time, has a significant impact on general health. In the context of psychiatric disorders, insufficient coping behavior under chronic stress has been linked to higher rates of (1) depressive symptoms among subjects of the general population, (2) relapse among patients under treatment for clinical depression,

and (3) negative symptoms among subjects with an elevated vulnerability to psychosis. In this normative study we assessed basic coping behavior among 461 Chinese freshman university students along with their consumption behavior and general health in terms of regular exercises, physical health, psychosomatic disturbances, and mental health. The assessments relied on two instruments that have already demonstrated their capability of (1) reliably detecting insufficient coping behavior under chronic stress and (2) reliably quantifying the interrelation between coping behavior and mental health in the Western world. Thus, we aimed to complement existing data and to develop a generally available, socioculturally independent tool that can be used for the early detection of subjects with an elevated risk of mental health problems. Structural analyses yielded essentially the same scales “activity” and “defeatism” as previous studies on 2,500 students from Switzerland, Italy, Spain, the USA, and Argentina. These scales explained 74.3% of the observed variance in coping behavior among the 461 Chinese students. We found highly significant correlations ($p < 0.0001$) between the “defeatism” scale on the one hand, and the scales “regular use of medicine,” “psychosomatic disturbances,” and “impaired mental health” on the other. Particularly intriguing was the finding that a neural net classifier could be constructed to identify students with the highest contributions to the interrelation between “coping behavior” and “mental health,” yielding a correlation coefficient as high as $r = 0.597$ for the respective subgroup. Based on the normative data, an online tool for risk assessments was developed with immediate feedback to users. This study provided another piece of evidence regarding the close link between basic coping behavior and mental health, across cultures and ethnicities. In consequence, our approach to quantifying basic coping behavior, along with other risk factors, can be expected to clear the way for an “early” detection of students with an elevated risk of stress-related mental health problems, *nota bene* prior to the development of clinically relevant symptoms. The socioeconomic impact of the potential prevention of depressive disorders, and psychiatric disorders in general, may be enormous.

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Background

Over the past 2 decades “globalization” has forced companies worldwide to continuously boost their productivity and competitiveness in order to meet the requirements of “global” markets. In consequence, chron-

ic stress¹ (e.g., due to shift work, unemployment) has become the dominating characteristic of modern time with significant impacts on general health [1]. As an evolutionarily central trait, response to stress activates the autonomic nervous system along with the endocrine systems to increase performance under challenging conditions. When stimulated chronically, however, an estimated 12–18% of the general population is unable to adapt adequately. In these cases, chronic stress can raise blood pressure [2], increase the risk of heart attack and stroke [3], suppress the immune system [4], and increase the risk of developing psychiatric disorders [5], such as anxiety [6], depression [7, 8], or schizophrenia [9, 10]. In the context of psychiatric disorders, insufficient coping behavior under chronic stress has been linked to higher rates of (1) depressive symptoms among subjects of the general population [11], (2) relapse among patients under treatment for clinical depression [12], and (3) negative symptoms among subjects with an elevated vulnerability to psychosis [13].

Stress-related health problems are as prevalent among college and university students as in the general population [e.g., 14]. Since 75% of subjects with major psychiatric disorders have their onset in the age range of 17–24 years [15], most campuses offer programs to help students with mental health issues and to educate academic staff with respect to the early detection of students at risk of psychiatric problems [e.g., 16]. In fact, students encounter significant levels of chronic stress over quite a long time (academic and nonacademic, such as competition in classroom, tight schedules, frequent exams, moving away from home, adaptation to new social environment, financial issues). This can aggravate pre-existing psychiatric conditions or can trigger the development of new stress-related health problems. Survey data show that 83% of students experience elevated levels of distress (19% of whom high or very high levels), compared to only 3% of the general population [e.g., 17, 18]. In addition to health problems, insufficient coping behavior under chronic stress can significantly affect the academic performance of students [e.g., 19]. It can lead to elevated alcohol consumption and/or the use of illegal drugs, or cause premature withdrawal from college/university prior to the completion of education [20]. The situation in China is comparable [21].

¹ State of bodily and/or mental strain caused by environmental or endogenous conditions that have measurable impacts on both body and mind in the general population.

Most interestingly, there is clear evidence of a link between cortisol stress response and personality [e.g., 22]. Mohr et al. [23] attempted to develop standardized means for the “early” identification of freshman students with insufficient coping skills under chronic stress and at risk for mental health problems. In their normative study of 1,217 students from three different sites in the USA and Switzerland, coping behavior and general health were quantified by two self-report questionnaires: the 28-item Coping Strategies Inventory COPE (dispositional version) was used to assess basic coping behavior while the 63-item Zurich Health Questionnaire ZHQ served as external validation criterion. The authors found two highly stable and reproducible scales that reflected socioculturally independent personality traits in terms of “activity-passivity” and “defeatism-resilience.” The external validation data revealed a close relationship between high scores on the defeatism scale and impaired physical and mental health: the higher a person’s defeatism score, the higher his/her impairment in terms of physical and mental health, combined with a higher consumption of illegal drugs and lack of physical activity. These personality traits were replicated through 3 independent, socioculturally diverse samples of university students from Italy ($n = 419$), Spain ($n = 400$), and Argentina ($n = 484$) [24].

In this present normative study, we assessed basic coping behavior among Chinese freshman university students along with their consumption behavior and general health. “General health” encompassed regular exercises, physical health, psychosomatic disturbances, and mental health. Assessment instruments were the 28-item COPE and the 63-item ZHQ. Based on the empirical data collected within the scope of this project, we addressed the following questions: (1) extent to which the structural properties inherent in basic coping behavior are comparable to those found in Europe, the USA, and South America; (2) interrelations between basic coping behavior and general health; and (3) extent to which the scales used to quantify basic coping behavior predict general health as assessed through the ZHQ.

Methods

Chinese Version of the COPE and ZHQ Instruments

In a first step, a native Chinese-speaking psychologist specialized in behavioral science and educated in the UK made a tentative translation from English to Chinese (Mandarin) of the two self-assessment instruments COPE and ZHQ. Secondly, another native Chinese-speaking psychologist (fluent in English and living in Switzerland) carried out the “blind” back-translation. Thus, the Chinese version of the two instruments was iteratively optimized.

Student Sample

Data were collected at the Zhejiang University in Hangzhou which is one of China’s oldest, most selective, and most prestigious institutions of higher education. Accordingly, mastering the university’s harsh selection process is a real challenge for students, thereby experiencing high levels of chronic stress. Using a “random sampling approach” rather than a “classroom approach” we recruited 461 1st- and 2nd-year freshman students² at central places of the Zijingang Campus³ by directly asking students for participation in our scientific project (wave I: $n = 193$; wave II two months later: $n = 268$). Students were informed about the goals of the study and then asked to fill out the printed Chinese version of the COPE and ZHQ instruments (download link: <https://www.ifrg.uzh.ch/instruments.php>). Completion of both instruments took a maximum of 10 min. The completed documents were subsequently archived for reference purposes (209 male students: mean age 19.3 ± 0.94 years; 252 female students: mean age 19.1 ± 0.94 years; native Han Chinese).

Structural Properties of the COPE Instrument

Once the COPE and ZHQ documents were computerized, we analyzed the structural properties of the empirical COPE data. For compatibility reasons, we used the same method of approach as described in detail by Mohr et al. [23] and Delfino et al. [24]. That is, we applied a neural network analysis and searched for COPE item configurations/clusters for which the within-cluster correlations (absolute values) were maximized while, simultaneously, the between-cluster correlations were minimized. We decided about the number of clusters by the amount of between-subject variance explained by the corresponding scales. Indeed, a high resolution of between-subject differences in terms of COPE item configurations is critically important when investigating the various facets of basic coping behavior and the interrelations with general health, consumption behavior, or regular exercises (variation = information).

To ensure reproducibility, a total of 100 random “split-halves” were applied using the first half of the sample for “learning” and the second half of the sample for “verification” of our results. Specifically, we used the following optimization criteria for COPE item clusters C1, C2, etc.:

$$\sum_{\substack{x, y \in C_k \\ x \neq y}} r(x, y) = \max (k = 1, 2, \dots)$$

Maximization : *within - cluster* (1)

$$\sum_{\substack{x \in C_k \\ x \in C_l}} r(x, y) = \min (k, l = 1, 2, \dots); k \neq l$$

Minimization : *between - cluster* (2)

where any kind of linear/nonlinear correlation/similarity measure r can be used for the calculation of $r(x, y)$. All 28 COPE items are included into the clusters. Thus, for *within-cluster* computations, we get $n \times (n - 1)$ correlation/similarity coefficients per cluster with n denoting the number of cluster items. Similarly, we get

² Power analyses based on European data suggested that a representative random sample of 400 test persons is required to reliably quantify 90% of the observable variance inherent in coping behavior under chronic stress (1,500 test persons for 95%).

³ First- and second-year undergraduates are living and studying on Zijingang Campus only so that freshman students of the envisaged age range had to be recruited there.

Normative Study on Coping Behavior and Stress (Hangzhou)

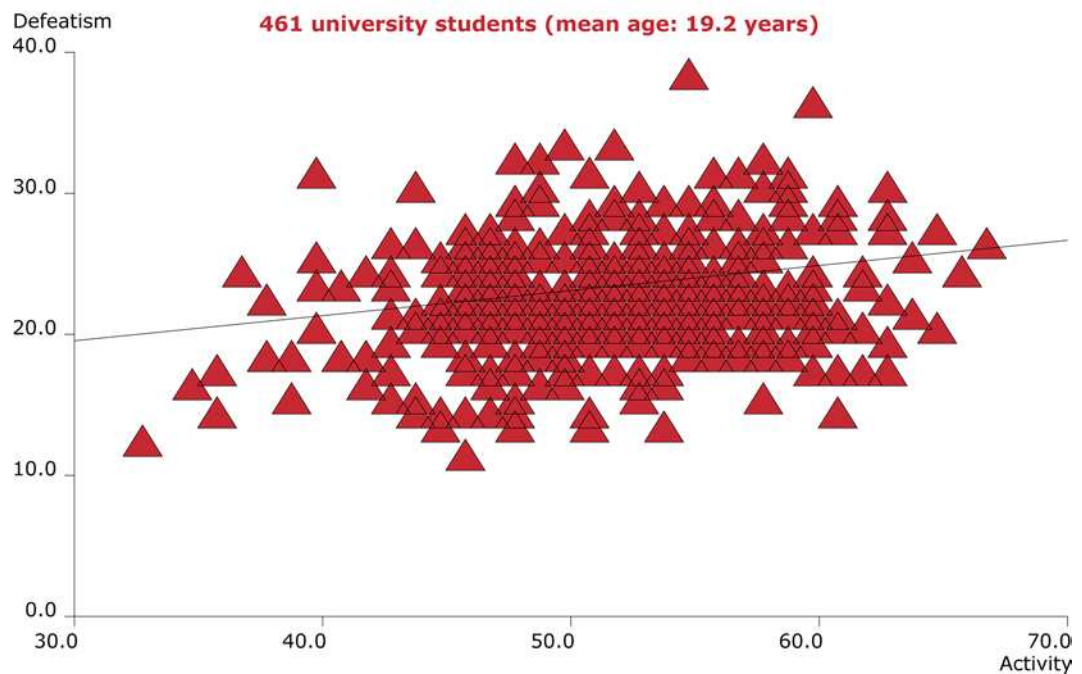


Fig. 1. Scatter plots of the raw scores “activity” (x axis) versus “defeatism” (y axis) as derived from the COPE data of 461 university students from Hangzhou (China). The high between-subject variation provides an excellent basis for detailing the interconnections with general health factors.

$n \times m$ correlation/similarity coefficients for between-cluster computations with n denoting the number of items of the first cluster and m that of the second cluster under comparison.

The final scales were orthogonalized by standard Gauss transformation (Gram-Schmidt algorithm) and normalized for zero means combined with standard deviations of 10. Upon completion of the COPE structural analysis, we run a principal component analysis (PROC FACTOR, SAS Statistical Analysis System) as independent verification of the newly constructed COPE scales. Details are given in the Results.

Scales Underlying the ZHQ Instrument

Basic analysis of the ZHQ instrument yields 8 scales constructed by summing up over the respective items: (1) tobacco consumption; (2) alcohol consumption; (3) regular use of medicine; (4) illegal drugs; (5) regular exercises; (6) physical health; (7) psychosomatic disturbances; and (8) mental health. When specific consumption behavior is of no particular interest, it is more convenient to pool the scales 1–4 into one single “consumption behavior” scale.

Statistical Analyses

For data analyses, we relied upon the Statistical Analysis Software SAS/STAT 9.3 (PROC CORR, FACTOR, FREQ, MEANS,

and TTEST) by SAS Institute Inc., Cary, NC, USA, while a proprietary program developed in the Institute for Response-Genetics, University of Zurich, was used for the neural network analysis.

Results

Structural Properties of the Coping Behavior Data

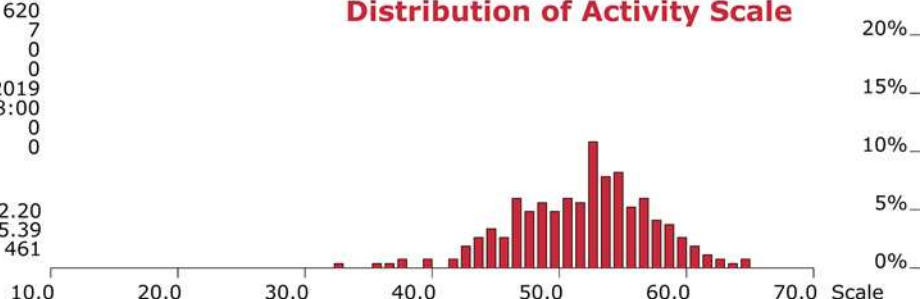
Structural analyses of the COPE data yielded, with two major scales, essentially the same results as previous studies on 1,214 students from Switzerland and the USA [23], and on 1,303 students from Italy, Spain, and Argentina [24]. However, 5 items displayed a somewhat instable behavior throughout split-half iterations and could not unambiguously be classified. The easiest way would have been to just eliminate these items. We decided, nevertheless, to keep them in order to avoid the information loss caused by such eliminations, that is, we implemented the 5 items according to the scheme published by Mohr et al.

Coping Behavior under Chronic Stress: Hangzhou Study (n=461)

Study: 620
 Group: 7
 Person: 0
 Day: 0
 Date: 12.06.2019
 Time: 15:58:00
 Status: 0
 Recording: 0

Distribution of Activity Scale

M = 52.20
 S = 5.39
 N = 461



Distribution of Defeatism Scale

M = 22.97
 S = 3.81
 N = 461

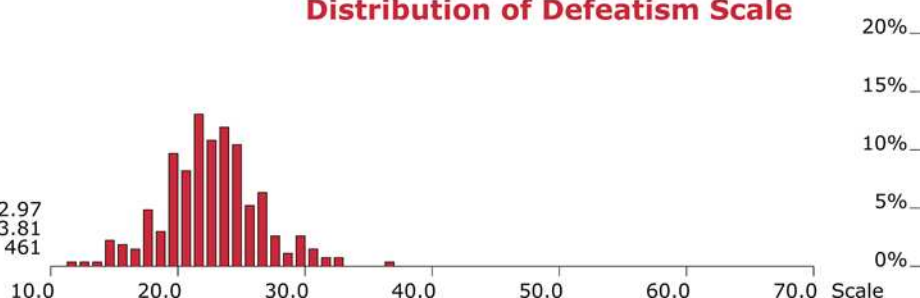


Fig. 2. The raw activity (upper half) and defeatism (lower half) scores show approximately normal distributions and give no indication of multimodality. This enabled normalization regarding zero means and standard deviations of 10 which is convenient for practical applications. The final scales were orthogonalized to be entirely uncorrelated.

[23]. The resulting scales “activity” (activity-passivity) and “defeatism” (defeatism-resilience) explained 74.3% of the observed variance and showed considerable between-subject variation with scores ranging from 30 to 70 (activity) and from 10 to 40 (defeatism) as shown in Figure 1.

The score distributions among the 461 students of our sample exhibited approximately normal characteristics (Fig. 2), thus enabling normalization for zero means and standard deviations of 10. The final scales were orthogonalized to be entirely uncorrelated.

“Activity” is best described through items like “turning to work,” “getting help and advice from other people,” or “coming up with a strategy” whereas “defeatism” is characterized by behavior like “giving up,” “using alcohol,” or “refusing to believe that this has happened.” Due to normalization (that is, transformation to zero means and standard deviation of 10) both scales have two poles. The opposite pole to activity is “passivity” which is under-

stood as negative scoring on the standardized activity scale. The opposite pole to “defeatism” is “resilience” which is understood as negative scoring on the standardized defeatism scale.

We used factor analysis as an attempt to independently verify the scales. This analysis failed in so far as the two factor-analytically derived scales associated with the two largest eigenvalues explained no more than 27.7% of the empirical variance. Based on the “min-eigen” criterion (eigenvalues >1) the analysis suggested retaining a total of 9 factors which explained 65.7% of the variance. Consequently, the linear approach to just explaining between-item correlations turned out to constitute an insufficient basis for modeling the complexity of basic coping behavior as assessed through the COPE instrument.

Sociocultural Cross-Comparisons

Even though the structural properties inherent in the COPE instrument were found to be largely independent

Table 1. Insufficient coping behavior versus general health

Alcohol consumption	defeatism	$r = 0.078$	$p = 0.0954$
Regular use of medicine	defeatism	$r = 0.146$	$p = 0.0016$
Impaired physical health	defeatism	$r = 0.051$	$p = 0.0514$
Psychosomatic disturbances	defeatism	$r = 0.272$	$p < 0.0001$
Impaired mental health	defeatism	$r = 0.286$	$p < 0.0001$
Regular exercises	passivity	$r = -0.119$	$p = 0.0105$

Correlation analyses reveal a close relationship between insufficient coping behavior on the one hand and state of general health, regular use of medicine, and lack of physical activity on the other ($n = 461$). The same correlation pattern was consistently found in previous studies in the USA, Europe, and South America, thus underlining significant interconnections between general health and basic coping behavior.

of sociocultural context (USA, several countries in Europe, South America, China), there were nonetheless between-population differences with respect to the average scoring on the normalized “activity” scale: Switzerland scored the lowest (-2), the USA, Spain, Italy, Argentina scored in the middle ($+3$), and China scored the highest ($+6$). The population differences on the “defeatism” scale were much smaller with mean values scattering around zero.

General Health in Terms of ZHQ Scales

Prior to analyzing the interrelations between the COPE scales and “general health” as assessed through the ZHQ instrument, we run consistency and plausibility tests on the empirical data derived from the 461 students. These tests yielded the expected results exhibiting the “standard” correlations between (1) “psychosomatic disturbances” and impaired “mental health” ($r = 0.495$; $p < 0.0001$); (2) “regular use of medicine” and impaired “mental health” ($r = 0.351$; $p < 0.0001$); (3) “psychosomatic disturbances” and impaired “physical health” ($r = 0.303$; $p < 0.0001$); as well as between (4) “regular exercises” and impaired “physical health” ($r = -0.169$; $p = 0.0003$).

Link between Coping Behavior and General Health

Given the above consistency and plausibility of the ZHQ data, we aimed to detail the interrelations between basic coping behavior and general health by means of correlation analyses. We found highly significant correlations ($p < 0.0001$) between the COPE “defeatism” scale on the one hand, and the ZHQ scales “regular use of medicine,” “psychosomatic disturbances,” and “impaired mental health” on the other. Details are given in Table 1.

Thus, our data provided convincing evidence that (1) the two COPE scales are largely independent of sociocultural contexts and, therefore, (2) represent in all likelihood evolutionarily old personality traits. These traits, in turn, were found to be significantly linked to impaired mental health and psychosomatic disturbances. The fact that the traits can reliably be quantified underlines the traits’ usefulness for risk assessments in view of the development of psychiatric disorders.

The correlations given in Table 1 relate to the sample as a whole entity ($n = 461$). However, it was readily possible to “train” a neural network classifier towards the identification of those students who contributed most to the correlation between the defeatism scale and impaired mental health (correlations $r > 0.6$ were achievable, depending on subgroup size; $r = 0.597$ for a 25% subgroup). As this method of approach optimizes the classifier’s criterion function with respect to “local” characteristics of the sample under investigation (“overoptimization”), it almost always leads to nonreproducible results⁴. Therefore, it is not very helpful in view of the envisaged “reliable” risk assessment procedure – even though it underlined the relevance of basic coping behavior as potential risk factor of psychiatric disorders.

To address the question of reproducibility, we decided in favor of a conventional threshold criterion. The problem here is, however, where to draw the line between risk and nonrisk cases: if the threshold is too low, one gets too many false-positive misclassifications; if the threshold is too high, the rate of false-negative decisions is getting too high. Our approach to solving the threshold problem relied on available a priori knowledge and defined a “risk zone” through those 18% of students who exhibited the highest scores on the defeatism scale and the lowest scores on the activity scale. This “risk zone” is shown in Figure 3 as gray area.

The students’ health data as assessed by the ZHQ instrument allowed us to mark subjects falling into this risk zone as “risk cases” of which a certain percentage will eventually develop psychiatric disorders. However, it is worth noting that being at “risk” is neither a necessary nor a sufficient condition for mental health problems.

It lies at hand that the performance of an exclusively COPE-based risk assessment can be further improved by evaluating information on “consumption behavior,” “regular exercises,” or “psychological distress.” Such extensions of the risk assessment method can easily be im-

⁴ That is, the classifier would not work sufficiently well with other populations.

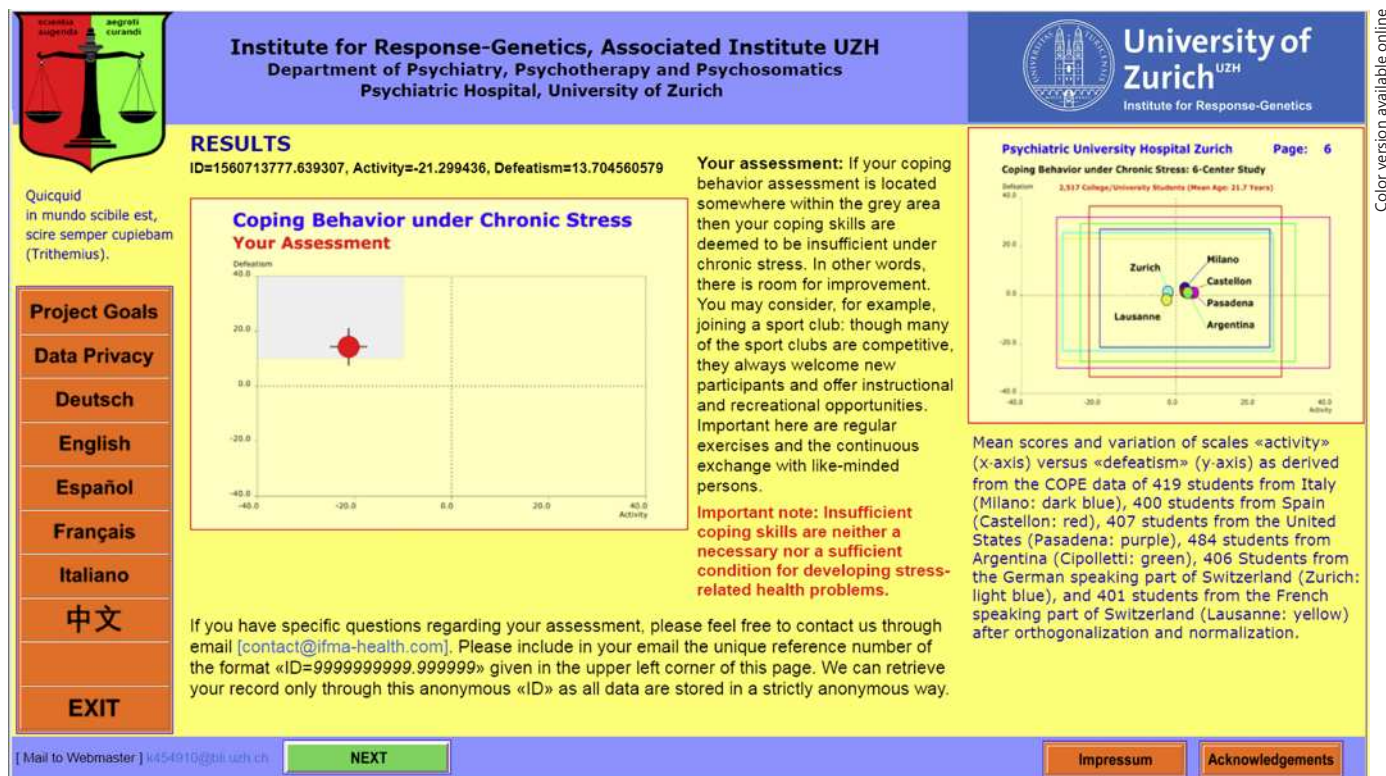


Fig. 3. Our online version of the combined full COPE and ZHQ instruments yields immediate feedback to users. If a user's coping behavior assessment is located somewhere within the gray area, then his/her coping skills are deemed to be insufficient under chronic stress. Decisions are made on the basis of the normative

data collected within the scope of this project (total $n = 2,978$). Important note: insufficient coping behavior is neither a necessary nor a sufficient condition for developing stress-related health problems.

plemented as an “add-on” while not noticeably prolonging the time needed to complete an anonymous self-assessment.

Online Self-Assessment Tool


In view of a generally available, strictly anonymous self-assessment method we have developed an online version of the combined full COPE and ZHQ instruments yielding immediate feedback to users (<https://www.ifrg.uzh.ch/WEBAPP/index.php>). This version is implemented on our server and available in 6 major languages (English, French, German, Italian, Spanish, and Chinese) for use on PCs and laptops (Fig. 4, 5).

The smartphone version with immediate feedback is currently under development. The smartphone app is designed as a stand-alone application and does not require access to our server. We expect that this app will raise awareness of (1) the interconnection between general health and basic coping behavior, and (2) the potential risk caused by insufficient coping behavior, in particular,

among people with a pre-existing elevated vulnerability to mental health problems. In fact, getting involved and doing something about it is the first and most important step toward the prevention of psychiatric disorders.


Discussion

Over the past decades we have observed that stress-related health problems are on the rise worldwide and, therefore, a steadily growing public health concern. Mental health plays a prominent role in this context, in particular depressive disorders and social anxiety. As a direct consequence, mental health problems are one of the main causes of the overall disease burden worldwide [e.g., 25]. In addition, depressive disorders also contribute to the burden of mortality and disability, thus having both a direct and an indirect impact on length and quality of life. Available treatments, though effective, are incomplete in so far as they induce improvement and recovery only in



Quicquid in mundo scibile est, scire semper cupiebam (Trithemius).

Institute for Response-Genetics, Associated Institute UZH
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 Psychiatric Hospital, University of Zurich



University of Zurich
 UZH
 Institute for Response-Genetics

Project Goals

Data Privacy

Deutsch

English

Español

Français

Italiano

中文

EXIT

Stress, Coping Behavior & General Health

Epidemiologic data suggest that approximately 10-15% of the general population show insufficient coping skills under chronic stress. Of these, 10% will eventually develop a psychiatric disorder.

对心境障碍的早期检测与预防

Detección precoz y Prevención de la depresión

Early Detection and Prevention of Mood Disorders

Früherkennung und Prävention von Depressionen

Diagnosi precoce e prevenzione della depressione

⇐ Bitte wählen Sie Ihre Sprache / Please select your language
 ⇐ Choisissez votre langue s'il vous plaît / Per favore selezionate la vostra lingua
 ⇐ Por favor, selecciona tu idioma / 请选择您的语言

Insufficient coping skills under chronic stress do not only increase the risk for eventually developing depressive disorders, but can also influence general health and quality of life in a negative way.

Test Your Coping Behavior under Stress and Your General Health

You can test yourself in 5-10 minutes within the scope of our scientific study through a completely anonymous procedure. Select your language and follow the instructions.

Testez vos capacités pour gérer le stress et votre santé général

Dans le cadre de notre étude scientifique vous pouvez vous tester en 5-10 minutes complètement anonyme. Choisissez votre langue et suivez les instructions.

Testen Sie Ihr Stressverhalten und Ihre allgemeine Gesundheit

Im Rahmen unserer wissenschaftlichen Studie können Sie sich anonym in 5-10 Minuten testen. Wählen Sie dazu Ihre Sprache auf der linken Seite und folgen den Instruktionen.

Valuti il suo comportamento in situazioni di stress e la sua salute generale

Nell'ambito della nostra ricerca scientifica può valutarci in modo anonimo in 5-10 minuti. Per questo scopo scelga la sua lingua e segua le istruzioni.

Evalúe su respuesta al estrés y su salud general

Compruebe por usted mismo en 5-10 minutos de forma completamente anónima en el marco de nuestro estudio científico. Seleccione su idioma y siga las instrucciones.

压力下的应对技巧与总体健康

本调查是一项科学研究的一部分。您可以在5-10分钟的时间里对自己进行测试。测试的过程是绝对匿名的。请选择您的语言并根据指导语进行后续操作。

[Mail to Webmaster] k454910@bik.uzh.ch

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Color version available online

Fig. 4. To provide a generally available, strictly anonymous self-assessment method, we have developed an online version of the combined full COPE and ZHQ instruments yielding immediate feedback to users. This version is implemented on our server and

available in 6 major languages (English, French, German, Italian, Spanish, and Chinese) for use on PCs and laptops. A strictly anonymous stand-alone version with immediate feedback to users for smartphones is currently being developed.

two thirds of patients and there is no cure in a considerable number of cases [26, 27].

All this underlines the significance and economic relevance of prevention methods along with tools that enable the early detection of stress-related risks of developing psychiatric disorders. This is the starting point where our project and our results aimed to contribute to a solution. For compatibility reasons we used the same design and the same instruments as in previous studies so that, ultimately, all available data can be pooled into a total sample of 2,981 students from the USA, Europe, South America, and China.

Analysis of the student data revealed a highly significant correlation between basic coping behavior and mental health. Most notably, we could readily train a neural network classifier to identify those students who contributed most to this correlation. The resulting 25% subgroup exhibited a correlation coefficient as high as $r = 0.597$ between insufficient coping behavior and impaired mental health. Similar correlations were also

found for “psychosomatic disturbances” and “regular exercises.” All these findings underline the close interrelation between basic coping behavior and mental health problems. The observed interrelation must not necessarily be causal. It could well be the case that this is an unrelated co-occurrence caused by higher-level factors such as a “general psychic vulnerability.” So far, there is no empirical way to decide about this question. The use of cortisol as a biochemical marker of chronic stress is a promising way to address this question [28–30]. The more so as personality traits have been found to modulate cortisol responses to acute social stress in major depression [31]. The technology for continuous 24/7 assessments of cortisol profiles (“circadian rhythms”) has already been developed [32].

However, clinicians are not primarily interested in causality but, rather, in a reliable tool that can “do the job.” All available empirical evidence suggests that the proposed tool can exactly do this job (available languages: English, French, German, Italian, Spanish, and Chinese).

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Your reaction in a difficult and stressful situation (1-7)?

I've been turning to work or other activities to take my mind off things
never ☐ rarely ☒ sometimes ☐ often ☐

I've been concentrating my efforts on doing something about the situation I'm in
never ☐ rarely ☐ sometimes ☒ often ☐

I've been saying to myself 'this isn't real'
never ☐ rarely ☒ sometimes ☐ often ☐

I've been using alcohol or other drugs to make myself feel better
never ☐ rarely ☒ sometimes ☐ often ☐

I've been getting emotional support from others
never ☐ rarely ☐ sometimes ☒ often ☐

I've been giving up trying to deal with it
never ☐ rarely ☐ sometimes ☐ often ☒

I've been taking action to try to make the situation better
never ☐ rarely ☐ sometimes ☒ often ☐

Instructions

People often react in different ways when they are faced with a difficult, challenging, or stressful issue in life. This questionnaire invites you to respond to how frequently you cope in the ways the statements suggest in terms of what you do or feel when you experience a stressful or challenging issue in your life. It is to be expected that the type of issue you face in a given situation may change the way you react. So answer the following questions from the viewpoint of what you generally do or feel most of the time. Please respond to every item and report what is true or mostly true for you, not what you believe other people would do in a similar situation facing the same issue.

Please respond to each statement by checking the appropriate answer.

Project Goals

Data Privacy

Deutsch

English

Español

Français

Italiano

中文

EXIT

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NEXT

Impressum

Acknowledgements

Fig. 5. The interactive COPE instrument is available in 6 major languages (English, French, German, Italian, Spanish, and Chinese) and provides immediate feedback to users regarding risk assessment.

There is an obvious limitation of our approach: the study relied on empirical data of university students in the age range between 17 and 24 years because (1) 75% of subjects with major psychiatric disorders have their onset in this age range, (2) university students encounter significant levels of chronic stress over quite a long time which can trigger the development of stress-related health problems, (3) university students do not differ from the general population in terms of basic coping behavior, and (4) university students can be recruited much easier than volunteers of the general population⁵.

In consequence, the normative data underlying the proposed tool may not necessarily be valid for other ages as well. However, several points speak against such a strict view. In the context of reactions to stress we are dealing with evolutionarily old traits: the autonomic nervous system in combination with the endocrine sys-

tems, both aiming to increase performance under challenging conditions. These evolutionarily old traits are major constituents of personality as well. And, for the vast majority of people personality traits are remarkably stable over a lifetime. Hence, we are confident that our tool will work equally well for people over 24 years of age. As a matter of course, we continue extending our data basis by data contributions of test persons worldwide who use our anonymous online tool (<https://www.ifrg.uzh.ch/WEBAPP/index.php>). Thus, we will eventually be able to verify the tool's performance for other ages.

Conclusions

This study provided another piece of evidence regarding the close link between basic coping behavior and mental health problems, across cultures and ethnicities. Particularly intriguing was the finding that a neural network classifier could be constructed to identify students with the highest contributions to the correlation between

⁵ Our newly developed strictly anonymous online tool with immediate feedback to users implements the COPE and ZHQ instruments. Thus, we hope to extend our data basis through data contributions from test persons worldwide (<https://www.ifrg.uzh.ch/WEBAPP/index.php>).

“coping behavior” and “mental health.” Based on the normative data collected within the scope of this project, an online tool for risk assessments could be developed with immediate feedback to users. Thus, the proposed approach to quantifying basic coping behavior, along with other risk factors, can be expected to clear the way for an “early” detection of students with an elevated risk of stress-related mental health problems, nota bene prior to the development of clinically relevant symptoms. The socioeconomic impact of the potential prevention of depressive disorders, and psychiatric disorders in general, may be enormous.

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Statement of Ethics

The study was approved by the local Ethics Committee in China.

Disclosure Statement

We have nothing to disclose.

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Author Contributions

Meng Zhang: research group leader at the Zhejiang University in Hangzhou, study administration. René Bridler: summarizing results, preparation of manuscript draft. Christine Mohr: research group leader at the University of Lausanne, normative data: analysis. Ines Moragrega: research group leader at the University of Valencia, normative data: analysis. Ningning Sun: research assistant at the Zhejiang University in Hangzhou, recruitment of students. Zhaoyue Xu: research assistant at the Zhejiang University in Hangzhou, recruitment of students. Zimo Yang: research assistant at the Zhejiang University in Hangzhou, recruitment of students. Michela Possenti: research assistant at the University of Milano, recruitment of students. Hans H. Stassen: principal investigator.

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